

FINAL TECHNICAL REPORT

AGENCY: NASA-Ames Research Center
 AGENCY AWARD NO.: NAG2-6004
 TITLE OF PROJECT: SPACE EXPLORERS OUTREACH PROGRAM

JUL 01 1996
 CASI

Principal Investigator:

D. A. Harper, Professor,
 Department of Astronomy
 and Astrophysics,
 University of Chicago

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For over three and a half years the Center for Astrophysical Research in Antarctica (CARA) has operated a program for African-American K-12 students in Chicago. Space Explorers (the high school students in the program participate in a wide range of educational activities in astronomy. They attend workshops at the Adler Planetarium, on the University of Chicago campus, and at Yerkes Observatory. CARA operates a summer institute for them every summer at Yerkes Observatory. A key program during the school year is one that uses the Adler Planetarium's Starlab. A Starlab is an inflatable, portable planetarium that can easily be transported to schools. The Space Explorers are highly experienced in the use of a Starlab and are trained to deliver programs for younger students. They reach over two thousand grammar school students each spring.

Positive lessons learned from our experiences:

- (1) The first is, of course, from the actual Starlab programs themselves. We reached 2,938 participants in 24 Chicago public elementary schools. Attached to this written report are copies of representative evaluations. The responses are generally very positive. The University of Chicago Office of Special Programs also reports that they have observed an improvement in the communication ability of the high school students who actually make the presentations in the Starlab. We continue to feel that the approach of having trained high school students conduct Starlab sessions in grammar schools is well founded.
- (2) Mr. Brass of the Adler Planetarium routinely hears or observes the following three reactions from the grammar school students served by this program: (a) they are very excited about learning astronomy, (b) they enjoy the participatory nature of the program, and (c) they tell us they want more educational experiences like this in their schools.

(3) Leveraging of other resources by these programs continues to be a major benefit. NASA's participation, even at a low level, is a powerful attraction to other funding sources. The details of where we stand in our current round of fundraising efforts are listed in the next section. The Chicago Space Explorers received an award for computer equipment from the NALCO Corporation. Another more recent development in this area, was a commitment of support from Wisconsin Power and Light, for budding efforts in Wisconsin at Yerkes Observatory. Four other proposals are pending and have all been strengthened enormously by NASA's commitment to outreach education.

Human and financial resources leveraged by NASA IDEA Grant activity:

(1) We receive significant human resources contributions, particularly from the University of Chicago Office of Special Programs (OSP), the Adler Planetarium, and the Center for Astrophysical Research in Antarctica. Although difficult to quantify precisely, the human support needed to make this program operate is approximately twice what NASA contributes. Namely, a \$10,000 Starlab outreach program really requires approximately \$20,000 in staff assistance.

(2) As stated above, this program has helped us attract private support. Here is a current summary of grants received or pending:

- (A) Nalco Foundation, awarded \$30K over three years for a computer center for the Chicago Space Explorers.
- (B) Wisconsin Power and Light, will announced an award to begin helping the Yerkes Space Explorers in January. Although only \$1,000, it is an important start for this local supporter.
- (C) Ameritech Corporation, grant proposal pending (Chicago Space Explorers).
- (D) Rockwell International Corporation, grant proposal pending (Chicago Space Explorers).
- (E) United Airlines, grant proposal pending (Chicago Space Explorers).
- (F) Aptar Group, grant proposal pending (Yerkes Space Explorers).

We are forceful advocates for the science partnership model we use. We have had a significant effect on nearly all of the National Science Foundation Science and Technology Centers as well as a few other institutions.

Center for Particle Astrophysics, Berkeley, CA
Big Foot Area School Council, Wisconsin
Oriental Institute of the University of Chicago
National Air and Space Museum, Washington, DC
NASA's Jet Propulsion Laboratory, Pasadena, CA
Center for Superconductivity at Argonne, IL
Fernbank Science Center, Atlanta, GA
Museum of Science and Industry, Chicago, IL

Most of the best science partnerships are, however, local or specific solutions in particular environments. The best way to "translate" what we do is to meet with prospective partners and help them find common ground within the constraints of the systems in which they operate. We feel that significant and sustained effort at coordination is the most important ingredient to making such partnerships work. We would hope that NASA, along with other funding agencies, will continue to realize this last point and work to develop and support an infrastructure model that encourages and facilitates the creation and support of broadly based, "grass roots", science partnerships.

Two Formal presentations and one paper were given during this grant period that featured this program. There was a presentation given during October, 1994 to the Center for Particle Astrophysics at Berkeley, Another presentation was given in Mark, 1995 in Australia at Mt. Stromlo Observatory, This latter presentation has also been accepted for publication by the Australian Journal of Astrophysics. This paper is entitled: "Educational Outreach Programs at the Center for Astrophysical Research in Antarctica," Sweitzer, J.S., Brass, C., Harper, D.A., Hawkins, L., Kron, R.G., and Whitt, A.S.

Starlab Evaluation

Dear Educator: We're pleased to have been able to present an Adler Planetarium education program for your students. Please take a moment to let us know what you thought of it and how to improve it for the future. Thank you!

1. How appropriate was this presentation for your class grade level? (circle one)

Excellent
concepts and vocabulary
perfect for my grade level

Good
students understood the
concepts and vocabulary

Fair
some of the concepts or
vocabulary weren't
understandable

Poor
concepts and/or
vocabulary
too difficult/ easy

2. Did your students have enough time to ask questions?

☒ Yes

☐ No

3. Do you think their questions were answered fully and clearly?

☒ Yes

☐ No

4. Would you recommend this program to others?

☒ Yes

☐ No

5. How can we improve our next presentation?

Keep: Starlab - instructors

Change/Add: - none at this time

6. Other comments:

- The children enjoyed
the presentation

Your name: Vernell Tibbs

Date: Jan. 12, 1995

School Name: Theodore Herzl

Address/zip: 3711 W Douglas

Thank you!

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Fair
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Poor
concepts and/or
vocabulary
too difficult/ easy

2. Did your students have enough time to ask questions?

[☒] Yes [] No

3. Do you think their questions were answered fully and clearly?

[☒] Yes [] No

4. Would you recommend this program to others?

[☒] Yes [] No

5. How can we improve our next presentation?

Keep: _____

Change/Add: _____

6. Other comments: *We would like to see this program monthly. Students really enjoyed the presentation.*

Your name: *Roseanne T. Johnson*

Date: *Jan 19 1995*

School Name: *Herz*

Address/zip: *3711 W. Douglas Blvd*

Thank you!

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vocabulary
too difficult/ easy

2. Did your students have enough time to ask questions? *they are apprehensive about asking questions; we are working on how to ask questions*
☒ Yes ☐ No

3. Do you think their questions were answered fully and clearly?

☒ Yes ☐ No

4. Would you recommend this program to others?

☒ Yes ☐ No

5. How can we improve our next presentation?

Keep: *tell teachers to copy pictures of constellations that were sent.*

Change/Add: *Posters - bring in - visual aids*

6. Other comments:

Your name: *Joia Kelly*

Date: *Jan 12, 1995*

School Name: *Hern Elementary School*

Address/zip: *3711 W. Douglas Blvd*

Chicago Illinois
60623

Thank you!

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vocabulary
too difficult/ easy

2. Did your students have enough time to ask questions?

☒ Yes ☐ No

3. Do you think their questions were answered fully and clearly?

☒ Yes ☐ No

4. Would you recommend this program to others?

☒ Yes ☐ No

5. How can we improve our next presentation?

Keep: _____

Change/Add: _____

6. Other comments:

Your name: Ms. L. Vines

Date: 12-15-94

School Name: Price

Address/zip: 4351 S. Drexel Bldg.

Thank you!

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concepts and/or
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too difficult/ easy

2. Did your students have enough time to ask questions?

☒ Yes [] No

3. Do you think their questions were answered fully and clearly?

☒ Yes [] No

4. Would you recommend this program to others?

☒ Yes [] No

5. How can we improve our next presentation?

Keep: The lecture! The students understood
the terms and showed much interest.

Change/Add: none

6. Other comments:

Your name: Jane L. Robinson

Date: December 14, 1994

School Name: Beulah Shoemith

Address/zip: 1330 W. 50th St., Chicago, Illinois 60615

Thank you!

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2. Did your students have enough time to ask questions?

☒ Yes ☐ No

3. Do you think their questions were answered fully and clearly?

☒ Yes ☐ No

4. Would you recommend this program to others?

☒ Yes ☐ No

5. How can we improve our next presentation?

Keep:

^{Keep} everything, the presentation was great
my students really learned a lot.

Change/Add:

Add more about the planets,
and the moon. Also, if possible explain
how the solar system was formed.

6. Other comments:

Your name: Miss Wilburn

Date: December 13, 1994

School Name: Clara Barton Elementary

Address/zip: 7650 S. Wolcott
Chicago IL 60620

Thank you!

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☒ Yes ☐ No

3. Do you think their questions were answered fully and clearly?

☒ Yes ☐ No

4. Would you recommend this program to others?

☒ Yes ☐ No

5. How can we improve our next presentation?

Keep: _____

Change/Add: _____

6. Other comments:

Your name: Sela Wilson

Date: 12-6-94

School Name: H/dridge

Address/zip: 630 East 131st Street Chicago Ill. 606

Thank you!

Km - 204

Starlab Evaluation

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2. Did your students have enough time to ask questions?

☒ Yes [] No

3. Do you think their questions were answered fully and clearly?

☒ Yes [] No

4. Would you recommend this program to others?

☒ Yes [] No

5. How can we improve our next presentation?

Keep: _____

Change/Add: Including a diagram
of the solar system can enhance
future presentations.

6. Other comments:

Thank you for everything

Your name: Doreen Penn (Sub)

Date: 11-29-94

School Name: Parker Academy

Address/zip: 6800 S. Stewart Ave 60621

Thank you!

Dear Educator: We're pleased to have been able to present an Adler Planetarium education program for your students. Please take a moment to let us know what you thought of it and how to improve it for the future. Thank you!

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2. Did your students have enough time to ask questions?

☒ Yes [] No

3. Do you think their questions were answered fully and clearly?

[☒] Yes [] No

4. Would you recommend this program to others?

☒ Yes [] No

5. How can we improve our next presentation?

Keep: _____

Change/Add: _____

6. Other comments:

Fantastic!

Your name: Jean Davis

Date: 11-30-94

School Name: Beasley

Address/zip: 5255 S. State

Thank you!

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2. Did your students have enough time to ask questions?

[✓] Yes [] No

3. Do you think their questions were answered fully and clearly?

[✓] Yes [] No

4. Would you recommend this program to others?

[✓] Yes [] No

5. How can we improve our next presentation?

Keep: THE FORMAT THE SAME

Change/Add: CLASSROOM VISITS SHOULD BE LIMITED TO 20 MINUTES
30 MINUTES WAS A LITTLE TOO LONG FOR THE STUDENTS TO SIT

6. Other comments: THE STUDENTS ENJOYED VISITING THE STARLAB

Your name: ELAINE G. RAY-RADFORD

Date: OCT. 25, 1994

School Name: BEASLEY ACADEMIC CENTER

Address/zip: 5255 SO. STATE ST.
CHICAGO, ILL. 60609

Thank you!

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2. Did your students have enough time to ask questions?

[☒] Yes [] No

3. Do you think their questions were answered fully and clearly?

[☒] Yes [] No

4. Would you recommend this program to others?

[☒] Yes [] No

5. How can we improve our next presentation?

Keep: The in-class oral presentation was
excellent.

Change/Add: _____

6. Other comments:

Your name: Frances Gore

Date: Nov. 29, 1994

School Name: Bessley Academic Center

Address/zip: 5255 So. State St Ochs 60609

Thank you!

Dear Educator: We're pleased to have been able to present an Adler Planetarium education program for your students. Please take a moment to let us know what you thought of it and how to improve it for the future. Thank you!

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too difficult/ easy

2. Did your students have enough time to ask questions?

☒ Yes [] No

3. Do you think their questions were answered fully and clearly?

☒ Yes [] No

4. Would you recommend this program to others?

☒ Yes [] No

5. How can we improve our next presentation?

Keep: _____

Change/Add: Give some follow up materials
a little quiz/ prize.

6. Other comments:

Your name: Mrs. Braswell

Date: Oct. 24, 1994

School Name: BEASLEY ACADEMY

Address/zip: 5000 ...

Thank you!

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2. Did your students have enough time to ask questions?

☒ Yes [] No

3. Do you think their questions were answered fully and clearly?

☒ Yes [] No

4. Would you recommend this program to others?

☒ Yes [] No

5. How can we improve our next presentation?

Keep: _____

Change/Add: _____

6. Other comments: Starlab is a wonderful program. It will assist me in providing enriching experiences for my students. The presenters were well organized and knowledgeable of subject matter.

Your name: Mary Landrum

Date: November 23, 1994

School Name: James Mc Cosh

Address/zip: 6525 S. Champlain (60637)

Thank you!

Starlab Evaluation

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some of the concepts or
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2. Did your students have enough time to ask questions?

☒ Yes ☐ No

3. Do you think their questions were answered fully and clearly?

☒ Yes ☐ No

4. Would you recommend this program to others?

☒ Yes ☐ No

5. How can we improve our next presentation?

Keep: _____

Change/Add: _____

6. Other comments:

Your name: David Moore

Date: 11-23-94

School Name: James McCosh

Address/zip: 6545 S. Champlain

Thank you!

Starlab Evaluation

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1. How appropriate was this presentation for your class grade level? (circle one)

| | | | |
|---|--|---|---|
| <u>Excellent</u> | Good | Fair | Poor |
| concepts and vocabulary perfect for my grade level | students understood the concepts and vocabulary | some of the concepts or vocabulary weren't understandable | concepts and/or vocabulary too difficult/easy |

2. Did your students have enough time to ask questions?

☒ Yes ☐ No

3. Do you think their questions were answered fully and clearly?

☒ Yes ☐ No

- E. A. 4. Would you recommend this program to others?

☒ Yes ☐ No

5. How can we improve our next presentation?

None

Change/Add:

6. Other comments:

This was a very good learning experience
the program is set up very well.

Your name: Pearlina R. Seaton

Date: 11-9-94

School Name: James Ward Elementary

Address/zip: 2701 S. Shields Ave. Chicago

Thank you!

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students understood the
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Fair
some of the concepts or
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Poor
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2. Did your students have enough time to ask questions?

☒ Yes [] No

3. Do you think their questions were answered fully and clearly?

☒ Yes [] No

4. Would you recommend this program to others?

☒ Yes [] No

5. How can we improve our next presentation?

Keep: I would keep everything as it is.
It was an excellent supplement to our
Change/Add: science program.

6. Other comments:

Your name: Ms. Stacey Raube

Date: 11-9-94

School Name: James Ward Elementary

Address/zip: 2701 S. Shields 60613

Thank you!

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☒ Yes ☐ No

4. Would you recommend this program to others?

☒ Yes ☐ No

5. How can we improve our next presentation?

Keep:

*include the whole school. This
will be our teaching of the solar system.*

Change/Add:

6. Other comments:

Your name:

Tony L. Fisher

Date:

June 8/1995

School Name:

Fermi

Address/zip:

7415 E. 70th St.

Thank you!

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2. Did your students have enough time to ask questions?

☒ Yes ☐ No

3. Do you think their questions were answered fully and clearly?

☒ Yes ☐ No

4. Would you recommend this program to others?

☒ Yes ☐ No

5. How can we improve our next presentation?

Keep: the same teaching approach.

Change/Add: _____

6. Other comments:

Your name: Onnie B. Stokley

Date: 6/8/95

School Name: Fermi

Address/zip: 1415 E. 70th Street

Thank you!

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2. Did your students have enough time to ask questions?

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3. Do you think their questions were answered fully and clearly?

☒ Yes [] No

4. Would you recommend this program to others?

☒ Yes [] No

5. How can we improve our next presentation?

Keep: _____

Change/Add: I would have liked for the class session and skylab presentation to be longer.

6. Other comments: I feel that the program was presented in an excellent fashion and it sparked a lot of enthusiasm and interest in the students.

Your name: Betty Cotton Gr. 6

Date: 12-6-94

School Name: Aldridge

Address/zip: 630 E. 131st St. Chgo. 60627

Thank you!

→ 25 min. in class and ^{15 min} skylab weren't long enough. Perhaps 40 min in both would be better because most African American children don't get a lot of exposure, and then were in the line in the class and then were in the line in the class and then were in the line in the class

inquisitive. The presenter^{Mr. B. Smith} was excellent but ...
he seemed rush to stay within the 25min.
time frame.